NEW DISCOVERIES ALL OVER THE EARTH

How Uncle Sam Sends Our Paper MONEY To the LAUNDRY

IT was the inventor of a washing machine, designed to cleanse ordinary household linen, who accidentally discovered that our paper currency could be washed without injury to any of its delicate fibres.

This inventor was so keen in the art of advertising the merit of his wonderful washing machine that he used to take money from his pocket, when exhibiting his machine before a crowd at a county fair, and, carelessly peeling off $50 or so in fives and tens, toss them nonchalantly into the tub of water along with the soiled linen. Then he would put the machine through its revolutions and take out the linen perfectly clean, also the money, clean and quite uninjured.

His whole object in doing this was to convince the prospective purchasers that his washing machine would not injure the finest fabric. He knew that if

A County Fair Incident That Led the Government to WASH Its PAPER CURRENCY

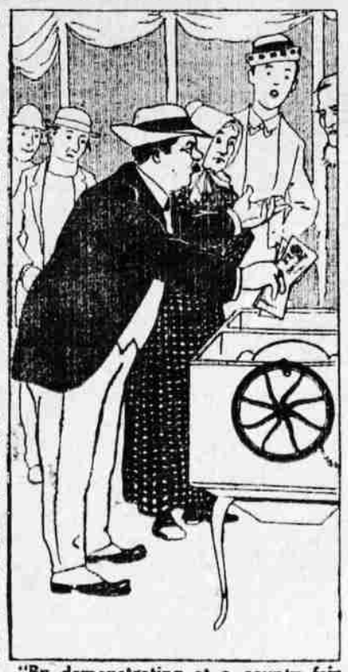
ne could convince them he was willing to risk $50 and prove that his machine wouldn't even tear or wear out paper, he had succeeded in a clever demonstration.

It was not until quite a while after he had been doing this that it suddenly occurred to him that his paper money was coming out of the machine quite as clean as the linen. Then he remembered the stories of dirty bills, germ-infected bills, and such things all being redeemed by the Government and macerated to make sure they would not be used over again as legal tender.

"Why go to all the expense and bother of redeeming paper money, macerating it and making new when the bills can be washed, disinfected and left clean and crisp as new with a fraction of tte cost, labor and time?"

This inventor, F. B. Churchill, of Shelbyville, Ind., wrote to the Treasury Department and informed the officials that he had solved the problem of cleaning soiled currency. The department asked him to give a demonstration of the operation of his machine. This was later done before a committee of Treasury officials and the result was so satisfactory that one of the machines was purchased for Government use and installed in the Treasury Department. It was not until after this test was made that Mr. Churchill realized the full magnitude of his discovery, and decided to apply for a patent on it. The latter has recently been granted. The washer consists of an oscillating vessel with air chambers and brackets to support a loosely woven basket, which is securely fastened inside, although it is adjustable.

The dirty bills are placed in the basket and securely



"By demonstrating at a county fair that his washing machine would not injure even paper money, the inventor discovered the value of this method to the Government."

locked therein by three separate locks, the reason for which is obvious. The basket is then placed within the body of the washer, which contains a solution of hot soapsuds and the machine is put in operation. The compressed air forces the suds and hot water through the meshes of the money basket with such force that the bills are cleaned thoroughly. The basket is then removed and placed in another washer which contains a solution of sizing or starch, and here the money is subjected to a thorough bath of stiffening, which gives it the crisp appearance of new bills. After a few minutes of immersion the basket is taken from the sizing machine and the water is drawn from the bills by centrifugal action.

During the operation of the drier a strong high-pressure current of air is turned into the rapidly revolving basket from the air-storage tank, and while the bills are being dried by the rapid motion imparted to the money basket the force of air is continually straightening out the folds from the bills. Then the basket is removed from the dried and unlocked, and the bills are passed through a heavy set of pressure rollers between layers of heavy cardboard, after which they emerge clean, crisp and resembling new money.

The process of cleansing the dirty bills seemingly puts new life into the paper, and the bills are pliable, having a soft, velvety feeling.

The renovation of currency will be a step that all banks and handlers of large amounts of money will appreciate.

The time is not far distant when every bank can be supplied with a fully equipped currency washer and drier. Thus the expense of reissuing new money will be reduced with great saving to the Government, as well as to the individual banker, who has to send in his old bills to be redeemed with new ones. The expense of sending the bills to the United States Treasury and Sub-Treasuries amounts to a heavy tax on those banks that are located at distant points.

For this reason the people in the West are compelled to handle more filthy, disease-breeding money than those in the East. A week or two is also lost before the money is returned. The saving of time and money will lead the large banks to install laundries of their own.

Heretofore it has been the policy of the Government to destroy its dirty and mutilated currency, but the new discovery of Mr. Churchill will revolutionize the system. The Treasury figures for 1910 show that $1,182,000,000 in soiled bills were redeemed by new ones. There were some 200,000,000 individual bills in this amount. Eighty per cent of them, or 160,000,000, might have been washed.

It costs 1.3 cents each to make these bills. They may be laundered for .1 of a cent. The saving will be 1.2 cents on each bill, or $2,080,000 a year. With due allowance for the discrepancy between theory and practise, it is estimated that a million dollars a year may be saved through the washing process.

It has been determined that the life of a one-dollar bill is one to two years, that of a $2 bill one to four years, and that of bills of larger denominations about three years. If by washing it the life of a bill can be lengthened, the Bureau of Engraving and Printing will have to manufacture but half as much money, and one of the expensive bureaus of the Government can be operated much more cheaply.

Will EUGENICS Put an End to GENIUS?

EUGENICS, the practically modern and interesting science of perfecting mankind physically, threatens to wipe out genius if there ever comes a time when all mankind shall become a perfect animal.

Some of these writers base their claim to this on the ground that a man possessed of an unusually able intellect has an abnormal brain and that when man becomes quite normal he will cease to be any more intelligent than the stolid bovine.

It all sounds rather absurd and perhaps a bit daring to make such a claim, but, nevertheless, several foremost thinkers of the day are beginning to doubt whether eugenics, if rigidly carried into execution (were such a thing possible), would really benefit the human race, or whether, in ridding humanity of all shortcomings and diseases, eugenics would not actually be depriving mankind of blessings in disguise. The science of eugenics, dealing with the betterment of the human race through breeding and selection, is still in its infancy, and it is well that the question should be discussed now.

One of the principal writers whose opinion must be cited as an arraignment against eugenics is Dr. Reed, writing in the Forum and the London Guardian. Dr. Reed calls particular attention to the Debt of Genius to Disease. He makes the astounding statement that many a writer of genius has attained eminence not in spite of his affliction, but because of it. Certain toxic poisons, produced by diseases, act as powerful stimulants to the brain and nervous system.

Stevenson, suffering from tuberculosis, found that he was able to do his best and most fluent work when his cough was most troublesome. While ill in bed suffering from a pulmonary hemorrhage, he wrote out the first draft of his famous "Dr. Jekyll and Mr. Hyde" in three days.

The list of other famous writers who fall into the same category are Milton, Dryden, Fielding, Gibbon, Macauley, Steele and the German poet Heine. Nelson, the great sea commander, was a weakling. Other names must be added to the list.

Napoleon in childhood was a cretin, that is, very nearly an imbecile, and it was only due to the skill of a physician, much in advance of his age, who understood the delicate connection between thyroid gland and efficiency, that one of the world's greatest intellects was saved.

Then there was Alexander Pope, the English poet, who was so weak and feeble that when he went to court it was necessary to swathe strong bandages around his entire body to insure ability to walk erect.

If eugenics then were to succeed in obviating all ills of the flesh, would mankind relapse into a state of stolid stodginess? Stimulants of some sort seem necessary to all adults. Tobacco is the average man's stimulant, yet a writer in the "Century" recently denounced tobacco as more dangerous to the community at large than opium. Women frequently use coffee as a stimulant. There are innumerable women brain-workers who could no more get through the day without their coffee than the average man can get through his day's work without his cigar or pipe. They are coffee topers as surely as the man dependent upon whiskey for inspiration is a whiskey toper, the caffeine contained in the coffee being the stimulating essence. Tea drinkers depend upon the theine contained in the tea to oil the grooves of their brain. Even so harmless a drink as chocolate contains a stimulant, theobromine, which communicates exhiliration to fatigued and weary brain cells.

Then, if the adult organism craves and requires a stimulant in order to get through with the day's work, is it judicious to attempt to cut out the internal stimulants which nature supplies as a compensation for the suffering entailed by disease? Dr. Reed states that five per cent of sufferers from gout are engaged in literary work, gout being due to a disturbance of the bodily metabolism and producing an enormous, patient intellectual force, while sufferers from bacterial diseases are filled with feverish eagerness and optimism.

The average brain worker, it is safe to allege, if given the preference between perfect bodily health accompanied by a sluggish brain, and the discomfort arising from physical suffering allied to a bright, active brain in good working trim would doubtless choose the latter.

Why Many Deep Sea FISH Are INVISIBLE

THE recent investigations into the life of the deeper portions of the ocean have brought to light an astonishing number of forms of fish, and especially of prawns of a brilliantly red color, living in the ocean at a depth of 500 fathoms, or 3,000 feet. But astonishing as it may seem, these brilliantly colored fish and prawns, instead of being conspicuous in the water at that depth, are almost invisible, when almost any other color could be easily seen. This led the investigators to try and find out why this particular depth of the ocean was associated with this vivid red colored marine life.

Accordingly photographic plates of great sensitiveness were sunk in the sea to various depths and the results recorded, the depth, the time of exposure, the effect on the plate and various other factors being carefully considered. Then plates were submerged in the water to various depths, having light filters, that is to say, being protected by a glass of a certain color which would stop all the rays of that color, just as a blue glass stops the red and yellow rays of sunlight and lets the blue rays through, while a red glass does the same for the red rays.

This led to the wonderful discovery that at the very point where the red marine life is found, the imperfect transparency of the water is such that the red part of sunlight is absorbed, and consequently the light that filters through to the region where the red prawns dwell possess no red rays and consequently is neutralized when striking upon the prawn. Later it was found, however, that in the far North the prawns dwelt at depths not so great, and there again experiments were made and it was found that the reason why these vividly-colored creatures were able to live safely nearer the surface in Northern waters was because the sun's rays struck the ocean at a greater angle than when nearer the equator, and that consequently they passed through an amount of water equivalent to the greater depth, though the angle at which they entered the water was such that it did not strike in so deeply. The pawn's bright color is his best protection at the exact depth where he dwells; did he swim higher or lower he would be so easily visible to his enemies that the race would soon become extinct.

Why You Should Keep Your HANDS Off Your FACE

"KEEP your hands off your face."

It seems almost like a foolish command, but careful doctors have recently learned that the person who is continually in the habit of keeping his hand on his face is three times as liable to have bothersome and even dangerous sores on the face as result.

Probably the majority of people, especially those of middle age who are inclined to think seriously, rub their hands over their face many times a day. Men and women both have a habit of resting their chin in the palm of their hands, or resting their cheek in their hands. They also, when thinking deeply of some problem, when in doubt, when worried, or when their mind is occupied—as with a book—pinch their nose, stroke their chin, rub their cheek, scratch their forehead, rub their ears, squeeze their underlip—and, in thousands of ways, almost constantly handle their face.

If people could only know how their hands are covered with microbes; if they could see the microbes that can be found on their hands almost any time of day, they would be startled. And this is where the danger lies. A woman may have a tiny pimple on her face, or a slight abrasion. A man may have cuts from shaving, little bruises and abrasions through both his work and his sport.

They are such tiny things one doesn't give them a thought, but they open a passage into the blood beneath the skin and, by constantly rubbing the face, many microbes can get from the fingers into these cuts and scratches and abrasions.

Of course, most of the microbes on the hands are harmless, but there are always bad microbes lurking about, and one may be pretty certain that a part of them get on the fingers. Many times people have terrible sores on their faces which are caused solely in this manner.

Keep your hands away from your face as much as poosible, and you will lessen the chances of troubles from microbes.

The ZERO That Has NO HEAT

ABSOLUTE zero, the point at which there is no heat whatever, has been fixed by scientists at 273 degrees below zero Centigrade, or about 530 degrees below zero Fahrenheit.

This amazing state of coldness has been produced by Professor Kamerling Onnes at his laboratory in the University of Leyden, Holland. One of the interesting results of this experiment has been to prove that life is not extinguished by this degree of cold.

The germ theory as advanced by Professor Svante Arrhenius and other scientists is, therefore, proved tenable. According to this theory, life has been carried from star to star and from planet to planet through space, in the form of microscopic germs driven by the power of light. The objection immediately offered to this theory was that the absolute zero of space would be fatal to the germs. This objection is now disposed of.

Heat is the energy of molecular motion, and at absolute zero the molecules are devoid of all motion.

In the cold-producing plant at Leyden gases of successively lower liquefying points are attacked, one after the other, the evaporation of each being used to absorb heat from the next in the series. This is called at Leyden a "cascade," and includes five "cycles," the gases used, in their order, being methyl chlorid, ethylene, oxygen, hydrogen and helium, with the production successively of temperatures of 90, 160, 210, 259 and 273 degrees below zero Centigrade.

Scientists of all countries may study at Leyden these different phenomena:

(1) The electric conductibility of metals at low temperatures.

(2) The momentary suspension of life in certain seeds. P. Becquerel has tried to see whether, at very low temperatures, the life of seeds could be suspended for a definite period and resumed again at the observer's pleasure. The law of the continuity of vital phenomena so often invoked by physiologists would seem to be at fault. According to it, life is a series of uninterrupted vital phenomena which in no case can undergo the slightest suspension without the intervention of death.

The experiments of Becquerel do not square with this law. As Armand Gautier says, seeds, or even the lower animals, may often be considered as machines at rest but ready to run—clocks taken to pieces that require only to be put together again.

Such experiments obviate one of the objections made to the germ theory according to which the germs of life fill all space. These germs, it is said, would be exposed during their course to the intense cold of interstellar space which they could not withstand. Now it has been proved that a temperature of —235 degree does not abolish the germinative faculty.

(3) The specific heats of solids at low temperatures. Investigations undertaken by Nernst and his pupils show that the specific heats diminish rapidly when the temperature falls.

Professor D'Arsonval, the famous French scientist, in commenting on the Leyden achievements, points out that the constitution of matter and the nature of electricity may be discovered by studying them in the neighborhood of absolute zero. The discoveries of Curie and others have shown us that the atom is like a solar system in miniature.

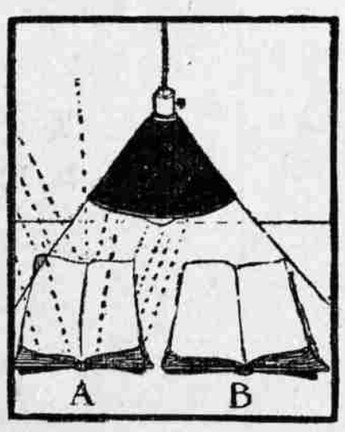
The atom is formed by the inconceivably rapid rotation of electric corpuscles, which contain, despite their minuteness, energies of tremendous violence.

Thus in an atom of hydrogen, which is thousands of times heavier than the billion billionth part of a milligramme, there are a thousand of these tiny bodies called "electrons" charged with negative electricity gravitating round a kernel charged with positive electricity. Professor Lodge has said that there is enough energy in a grain of hydrogen to raise the British navy to the top of the Himalaya Mountains.

Why We Become SHORT-SIGHTED

WHY do so many of us become short-sighted when nature obviously intended us to have normal sight? The reason lies principally in the misuse of the eyes during a brief period of childhood.

Dr. Bogdan, of Budapest, has just published an account of his examination of 200 school text-books from a sanitary point of view. He has here drawn particular attention to the fact, already established by many prominent investigators, that short-sightedness in children either originated or developed in connection with school education. The chief causative agency was, in fact, to be found in too prolonged reading, writing and drawing, whereby visual accommodation as well as convergence were greatly fatigued. Undue strain of the muscles of accommodation caused an active hyperaemia; the return flow of the venous circulation was greatly hindered, there was an increase of the intra-ocular pressure, and the outer coat of the eye was gradually stretched. Too strong convergence worked even greater harm for the eye in various ways.



Glossy Paper (A) Reflects the light Back Into Reader's Eyes. Rough Paper (B) Absorbs Light and Is Uninjurious.

It must also be observed that in some of the children short-sightedness was hereditary, and they became affected much sooner than their healthy comrades. In addition to the above causes producing short-sightedness, mention must be made of insufficient admission of light in many schools; a similar remark applied to unsuitable desks and other school furniture. As regards the influence of books on the eyesight, Dr. Bogdan insisted that paper should not have a glossy surface, for under artificial light a surface of this kind prevented the eye from seeing well and necessitated moving the book to and fro, as well as frequent changes in the position of the head. Again, the paper should be thick enough to prevent the printing of the next page from obtruding itself upon the reader's eye. A few authorities have recommended yellow paper, but the majority were in favor of white paper, which gave a better contrast between the printed matter and the background. In any event, however, the paper should be rough or dull-surfaced enough to absorb the light.

Beetles That Grow MUSHROOMS

FRENCH entymologists have recently discovered that there are certain beetles of the wood-boring varieties that do not get their food from the wood itself, or from any tiny insects that may be in the wood, but from a sort of mushroom that grows in the holes they have bored.

Mushroom-growing ants have been known for quite a while, but that the wood-boring beetles also bored into wood solely to grow these fungii, or mushrooms, was not known.

"When we examine the walls and cavities," says Henri Coupin, writing of the entymologist J. Bouverie's studies of this beetle, "made by these insects of the group of Bostrychides in the wood of our trees we find a sort of white crust, which appeared to the earliest observer to be only a salty excretion. Hartig recognized that this crust was a reality formed by a fungus, and that its presence was responsible for the change in the color of the walls to brown.

"This fungus—there are in reality several species, which Mr. Bouverie has studied—is not a simple mold, which would be useless or even harmful to the insect. It is in reality very useful in forming a healthful and abundant food for the larvae, which is proved by the fact that the latter develop better when it is more abundant. This is also explained by the fact that the filaments of the fungus end on the gallery side in globules, rich in glycogen and oil. Further, the fungi of the galleries bored by the Bostrychides serve in some sort as drains to draw off the nitrogenous matters in the wood and place them at the disposal of the larvae. These conditions are so well adapted to the fungus that the tissue formed by it constitutes literally a pure culture.

"The first spores of the fungus seem to be brought in by the adult insects. This sowing of the seed is evidently involuntary on their part; but both insect and fungus make the best of their association, for the fungus finds itself located, by the act of the insect, in a very favorable medium, and, on the other hand, the insect finds in it a food sufficiently tender for its feeble jaws."

These Tiny Beetles Bore Into the Trees and Plant Microscopic Fungus Mushrooms Upon Which the Larvae Feed